commands, e.g. changing the area viewed on the display
screen or controlling the performance of a particular
parameter associated with the device. Further, given the
limited area available, not only on the display screen but
5 also on the entire device, adding additional control keys,
etc., is both difficult and burdensome to a user requiring
two hand operation of the device.

US 6466198 discloses a system and method for view
10 navigation and magnification of the display of hand-held
devices in response to the orientation changes along only
two axes of rotation as measured by sensors inside the
devices. The view navigation system can be engaged and
controlled by simultaneously pressing switches on both
15 sides of the hand-held device. Miniature sensors like
accelerometers, tilt sensors, or magneto-resistive
direction sensors sense the orientation changes. These
miniature sensors are presently not typically standard
equipment for hand-held devices. Thus, such sensors add
20 cost, use precious space and add weight.

The present invention is directed toward overcoming one or
more of the above-identified problems.

25 DISCLOSURE OF THE INVENTION

On this background, it is an object of the present
invention to provide a hand-held device of the kind
referred to initially, which allows user input with the
30 same hand that holds the device, without requiring the
dedicated sensatory equipment used by prior art hand-held
devices.

This object is achieved in accordance with claim 1, by
35 providing a hand-held device comprising a processor, a
digital camera for capturing motion video or still images,

and means for transforming a signal from the camera into a
motion signal indicative of the motion of the hand-held
device.

5   Thus, by using a sensor that is available to start with in
many hand-held devices -- namely a digital camera -- for a
secondary use, namely creating a motion signal indicative
of the motion of the hand-held device, a hand-held device
with motion sensing is provided in a economical and
10 reliable manner.

The hand-held device may further comprise a user interface
in which motion of the hand-held device is - through the
motion signal derived thereof - used as a user input.
15

The hand-held may further comprise a display, preferably a
display suitable for displaying captured images.

Motion of a given type of the hand-held device can be used
20 to manipulate images shown at least in part on the
display, preferably by moving the images in a manner
substantially corresponding to the movement of the hand-
held device.

25 Different types of motion the hand-held device can e.g. be
used to move, and/or zoom, and/or expand/collapse and/or
rotate images displayed on the display.

Motion substantially parallel to the plane of the display
30 of the hand-held device can be used to scroll an image
displayed on the display. Motion substantially
perpendicular to the plane of the display can be used to
zoom an image displayed on the display. Rotational motion
of the hand-held device can be used to rotate an image
35 displayed on the display.

interface, and the functionality of the second key can be associated with calling up a context-sensitive menu.

5   The selection of the object concerned can be performed by pressing and releasing the first key. Activation of the object concerned can be performed by pressing and releasing the first key twice in rapid succession. Moving or resizing of the object concerned can be performed by holding down the first key while moving the hand-held
10   device to move the cursor.

The first key and the second key can be softkeys, whereby the current functionality of the softkeys is shown in the display, preferably in dedicated fields of the display.

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The first key can be placed below the display on the left side of the latter, preferably proximate to lower edge of the display, and the second key can be placed below the display on the right side of the latter, preferably
20   proximate to lower edge of the display.

It is another object of the present invention to provide an improved method for proving user input to hand-held devices. This object is achieved by providing a method for
25   creating user input for a hand-held device that has a processor, a user interface and a digital camera for capturing motion video or still images comprising the steps of:
         determining motion of the hand-held device from
30   the camera signal;
         using the determined motion of the hand-held device
         as an input for the user interface.

It is yet another object of the present invention to
35   provide a use of a digital camera of a hand-held device

CLAIMS:

1. A hand-held device comprising a processor, a digital
camera for capturing motion video or still images, and
5   means for transforming a signal from the camera into a
motion signal indicative of the motion of the hand-held
device.

2. A hand-held device according to claim 1, further
10 comprising a user interface in which motion of the hand-
held device is - through the motion signal derived thereof
- used as a user input.

3. A hand-held device according to claim 1 or 2, further
15 comprising a display suitable for displaying captured
images.

4. A hand-held device according to claim 3, in which
motion of a given type of the hand-held device is used to
20 manipulate images shown at least in part on the display,
preferably by moving the images in a manner substantially
corresponding to the movement of the hand-held device.

5. A hand-held device according to claim 4, in which a
25 given type of motion the hand-held device is used to move,
and/or zoom, and/or expand/collapse and/or rotate images
displayed on the display.

6. A hand-held device according to claim 5, in which
30 motion substantially parallel to the plane of the display
of the hand-held device is used to scroll an image
displayed on the display, and/or motion substantially
perpendicular to the plane of the display is used to zoom
an image displayed on the display and/or rotational motion
35 of the hand-held device is used to rotate an image
displayed on the display.

7. A hand-held device according to any of claims 4 to 6,
in which the images are images previously captured by the
camera.

5

8. A hand-held device according to any of claims 4 to 7,
in which movement of image is inverted with respect to
motion of the hand-held device.

10   9. A hand-held device according to any of claims 2 to 8,
in which the user interface comprises a graphical user
interface, and wherein motion of the hand-held device is
used as an input to the graphical user interface.

15   10. A hand-held device according to claim 9, in which
motion of the hand-held device is used to manipulate an
object displayed by the graphical user interface,
preferably by moving the object in a manner substantially
corresponding to the motion or to the inverted motion of
20   the hand-held device, whereby the object displayed by the
graphical user interface can be, an icon, a dialogue box,
a window, a menu or a pointer.

11. A hand-held device according to claim 9, in which
25   motion of a given type of the hand-held device is used to
move, and/or zoom, and/or expand/collapse and/or rotate
objects displayed by the graphical user interface.

12. A hand-held device according to claim 11, in which
30   motion substantially parallel to the plane of the display
of the hand-held device is used to scroll an object
displayed by the graphical user interface, and/or motion
substantially perpendicular to the plane of the display is
used to zoom an object displayed by the graphical user
35   interface and/or rotational motion of the hand-held device

is used to rotate an object displayed by the graphical user interface.

13. A hand-held device according to any of claims 2 to 12, in which the digital camera is detachable.

14. A hand-held device according to any of claims 2 to 13, in which the digital camera is movable relative to the hand-held device.

15. A hand-held device according to any of claims 2 to 14, in which the means for transforming a signal from the camera into a motion signal derives the motion signal from changes between succeeding images, or parts of succeeding images captured by the camera.

16. A hand-held device according to any of claims 2 to 15, in which the camera has an autofocus system, whereby the focusing setting of the autofocus system is used for detecting movement in the camera direction.

17. A hand-held device according to any of claims 2 to 16, further comprising at least one key, wherein the functionality of a motion type is dependent on the state of the at least one key.

18. A hand-held device according to any of claims 2 to 17, in which rotational motion of the hand-held device about an axis substantially perpendicular to the display results in an inverse rotational movement of the image or graphical user interface object relative to the display, preferably in a manner such that the image or object is static with respect to the fixed coordinate system in which the hand-held device is situated.

19. A hand-held device according to any of claims 2 to 18, in which the motion signal is used to adjust device settings, the device settings preferably comprising sound settings and display settings.

20. A hand-held device according to any of claims 9 to 19, further comprising a keypad with at least a first- and a second key and the graphical user interface comprises a cursor, whereby motion of the hand-held device is used to position the cursor over an object of the graphical user interface and primary functions associated with the object concerned are activated by pressing the first key and secondary functions associated with the object of the concerned are activated by pressing the second key.

21. A hand-held device according to claim 20, in which the functionality of the first key is associated with selection and activation of objects of the graphical user interface, and in which the functionality of the second key is preferably associated with calling up a context-sensitive menu.

22. A hand-held device according to claim 21, in which selection of the object concerned is performed by pressing and releasing the first key, and activation of the object concerned is preferably performed by pressing and releasing the first key twice in rapid succession.

23. A hand-held device according to claim 21 or 22, in which moving or resizing of the object concerned is performed by holding down the first key while moving the hand-held device to move the cursor.

24. A hand-held device according to any of claims 20 to 23, in which the first key and the second key are softkeys whereby the current functionality of the softkeys   is

shown in the display, preferably in dedicated fields of
the display.

25. A hand-held device according to claim 24, in which the
5   first key is placed below the display on the left side of
the latter, preferably proximate to lower edge of the
display, and the second key is placed below the display on
the right side of the latter, preferably proximate to
lower edge of the display.

10

26. A hand-held device according to any of claims 1 to 25,
further comprising at least one gravity based tilt sensor,
and whereby the signal from the at least one tilt sensor
is used in combination with the signal from the camera for
15 creating the motion signal.

27. A hand-held device according to claim 26, wherein a
tilt sensor is associated with the X-axis and/or a tilt
sensor is associated with the Z-axis.

20

28. A hand-held device according to claim 27, wherein the
signal form the at least one tilt sensor is used to
determine the absolute orientation of the handheld device
relative to the direction of the gravitational pull.

25

29. A hand-held device according to any of claims 1 to 28,
further comprising means for sending the motion signal to
another terminal via cable, infrared waves or radio
frequency waves.

30

30. A system comprising a hand-held device according to
claim 29 and a terminal capable of displaying imaginary
three-dimensional objects on a two-dimensional screen,
said terminal comprising means to change the orientation
35 of the displayed object in response to signals received
from the handheld device, whereby orientation changes of

the hand-held device are translated to corresponding orientation changes of the displayed object.

31. A system according to claim 30, in which position changes of the handheld device are translated to position changes of the displayed object.

32. A system comprising a hand-held device according to claim 29 and a terminal capable of displaying an imaginary three-dimensional space on a two-dimensional screen, said terminal comprising means to change the viewing position in the imaginary three-dimensional space in response to signals received from the handheld device, whereby positional changes of the hand-held device are translated to corresponding changes in the viewing position.

33. A system according to claim 30, in which orientation changes of the handheld device are translated into corresponding changes in the viewing direction in the imaginary three-dimensional space.

34. A method for creating user input for a hand-held device that has a processor, a user interface and a digital camera for capturing motion video or still images comprising the steps of:
        determining motion of the hand-held device from
        the camera signal;
        using the determined motion of the hand-held device
        as an input for the user interface.

35. Use of a digital camera for capturing motion video or still images of a hand-held device that has a processor to produce a motion signal indicative of motion of the hand-held device.

36. A hand-held device comprising a processor, means for sensing motion of the hand-held device, a display, a keypad with at least a first- and a second key, a graphical user interface with objects and a cursor, and means for transforming the sensed motion of the handheld device into a signal suitable for moving the cursor over the display.

37. A hand-held device according to claim 36, in which motion of the hand-held device is used to position the cursor over an object of the graphical user interface and primary functions associated with the object concerned are activated by pressing the first key and secondary functions associated with the object concerned are activated by pressing the second key.

38. A hand-held device according to claim 37, in which the functionality of the first key is associated with selection and activation of objects of the graphical user interface, and in which the functionality of the second key is preferably associated with calling up a context-sensitive menu.

39. A hand-held device according to claim 38, in which selection of the object concerned is performed by pressing and releasing the first key, and activation of the object concerned is preferably performed by pressing and releasing the first key twice in rapid succession.

40. A hand-held device according to claim 38 or 39, in which moving or resizing of the object concerned is performed by holding down the first key while moving the hand-held device to move the cursor and the object concerned in unison therewith.

41. A hand-held device according to any of claims 36 to 40, in which the first key and the second key are softkeys whereby the current functionality of the softkeys is shown in the display, preferably in dedicated fields of the display.

42. A hand-held device according to claim 41, in which the first key is placed below the display on the left side of the latter, preferably proximate to lower edge of the display, and the second key is placed below the display on the right side of the latter, preferably proximate to lower edge of the display.

43. A hand-held device according to any of claims 36 to 42, in which said means for transforming motion of the handheld device into a signal suitable for moving the cursor over the display comprises a tilt sensor and/or an image capturing device and/or an accelerometer.

44. A hand-held device according to claim 43, in which said image capturing device is a motion video or still image digital camera.

45. A hand-held device according to any of claims 36 to 44, further comprising means to transform a signal from the camera and/or tilt sensor and/or accelerometer into a position signal for the cursor.

46. A hand-held device according to claim 45, in which said means for transforming a signal from the camera into a motion signal derives the motion signal from changes between succeeding images, or parts of succeeding images captured by the camera.

47. A hand-held device according to any of claims 44 to 46, in which the camera has an autofocus system, whereby

the focusing setting of the autofocus system is used for detecting movement in the camera direction.

48. A hand-held device according to any of claims 36 to
47, in which the graphical user interface includes one or more of the following object types: icons, dialogue boxes, windows, menus, pointers.